## **CLAIMS**

- 1. An optical fiber comprising a core comprising silica and a cladding surrounding the core *characterized in that* the core is doped with at least about 6 mol% germania and at least about 0.9 wt% fluorine.
- 2. The optical fiber of claim 1, wherein the core is doped with at least about 7 mol% germania.
- 3. The optical fiber of claim 1 or claim 2, wherein the core is doped with at least about 1.2 wt% fluorine.
- 4. The optical fiber of any one of the preceding claims, wherein the core is substantially devoid of boron.
- 5. The optical fiber of any one of the preceding claims, wherein the core includes no other dopants in substantial amounts.
- 6. The optical fiber of any one of the preceding claims, wherein the optical fiber has a numerical aperture of less than about 0.22 at 1550 nm.
- 7. The optical fiber of any one of the preceding claims, wherein the core exhibits an index change of at least about  $5.5 \times 10^{-4}$  at a wavelength of 1550 nm when exposed to a dose of radiation having a wavelength of 244 nm and an energy of 428 J through a phase mask yielding an interference pattern with a visibility of about 80%, said exposure being performed without hydrogen loading of the optical fiber.
- 8. The optical fiber of any one of the preceding claims wherein the core exhibits a ratio of index change at 1550 nm to numerical aperture of at least about  $3.0 \times 10^{-3}$ , the index change being caused by an exposure in the absence of hydrogen loading to a dose of radiation having a wavelength of 244 nm and an energy of 428 J through a phase mask yielding an interference pattern with a visibility of about 80%.
- 9. The optical fiber of any one of claims 1-6, wherein a Bragg grating is present in the core of the optical fiber.
- 10. The use of the optical fiber claimed in any one of claims 1-5 in a method of fabricating a fiber Bragg grating comprising exposing a section of the optical fiber to patterned UV radiation, thereby writing the grating in the core of the fiber.
- 11. The use claimed in claim 10 in which the said section is so exposed without hydrogen-loading of the fiber.

12. A method of fabricating a fiber Bragg grating, the method comprising the steps of providing an optical fiber comprising

a core, the core comprising silica doped with at least about 6 mol% germanium and at least about 0.9 wt% fluorine, and

a cladding surrounding the core; and

exposing a section of the optical fiber to patterned UV radiation, thereby writing the grating in the core of the fiber.

- 13. The method of claim 12, wherein the exposure is performed without hydrogen loading of the fiber.
- 14. The method of claim 12 or claim 13, wherein the core of the optical fiber is doped with at least about 7 mol% germania.
- 15. The method of an one of claims 12-14, wherein the core of the optical fiber is doped with at least about 1.2 wt% fluorine.
- 16. The method of any one of claims 12-15, wherein the core of the optical fiber is substantially devoid of boron.
- 17. The method of any one of claims 12-16, wherein the core of the optical fiber includes no other dopants in substantial amounts.
- 18. The method of any one of claims 12-17 wherein the optical fiber has a numerical aperture of less than about 0.22 at 1550 nm.
- 19. The optical fiber of claim 1, wherein the cladding comprises a material selected from the group consisting of substantially undoped silica, germania-fluorine co-doped silica, and phosphorus-fluorine co-doped silica.
- 20. The optical fiber of claim 1, wherein the optical fiber has a numerical aperture of less than about 0.16 at 1550 nm.
- 21. The optical fiber of claim 1, wherein the core exhibits a ratio of saturated index change at 1550 nm in the absence of hydrogen loading to numerical aperture is at least about  $9.0 \times 10^{-2}$
- 22. The method of claim 12, wherein the cladding of the optical fiber comprises a material selected from the group consisting of substantially undoped silica, germania-fluorine co-doped silica, and phosphorus-fluorine co-doped silica.
- 23. The method of claim 12, wherein the optical fiber has a numerical aperture of less than about 0.16 at 1550 nm.

## 24. An optical fiber comprising

A core, the core comprising silica doped with at least about 6 mol% germania and with fluorine; and

a cladding surrounding the core, wherein the optical fiber has a numerical aperture of less than about 0.22 at 1550 nm.

- 25. The optical fiber of claim 24 wherein the optical fiber has a numerical aperture of less than about 0.16 at 1550 nm.
- 26. The optical fiber of claim 24 wherein the core is doped with at least about 0.9 wt% fluorine.
- 27. The optical fiber of claim 24 wherein the core is substantially devoid of boron.